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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/596,549	06/19/2000	Andrew Booth	H-525US	2122

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EXAMINER

LUK, EMMANUEL S

ART UNIT	PAPER NUMBER
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1722

14

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/596,549	Applicant(s) BOOTH ET AL.	
	Examiner Emmanuel S. Luk	Art Unit 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,9,13-22 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 6,7 and 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 8, 9, 14-19, 22, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juliano et al in view of Riley and Manov et al.

Juliano teaches a thick film heater for injection mold runner nozzle having a tubular body (32) with a tubular heater core applied on the surface. A dielectric layer and resistive element thick film layer covers the heater surface that are printed on (Col. 6, lines 22-23). Further, an acrylic glaze layer coats the layers, while lead termination pads are in contact with the dielectric layer. The nozzle is shown to be non-flat and cylindrical in the Figures.

Juliano fails to teach silk-screened dielectric layer and contact pads, insulation layer over restrictive layer, an annular connector housing for mechanical connection of a contact to each contact pad, ceramic housing, steel substrate and gold plated steel contact pad and the resistive layer having at least one resistive trace in a pattern that is discontinuous circumferentially and a plurality of traces.

The acrylic glaze layer would act as an insulation layer on top of the resistive layer. The termination pads acting as contact pads are printed on (Col. 6, lines 61-61), the connector housing being a heater sheath (6) having wires that lead to the contacts.

Riley teaches a thick film circuit element having substrates and layers that are formed via silk screen (Col. 3, line 67) onto the surfaces of the substrate (12). The substrates can be made of ceramic (Col. 3, line 65), other substrates include stainless steel (Col. 2, lines 65-66) and noble metals, such as gold (Col. 1, line 41) for use in the circuit. Riley teaches the use of a variety of different materials in the substrates, this also suggests use in parts other than substrates including the housing and contact pads, such as a ceramic housing and gold plated steel on the contact pads.

In regards to claims 17-19, the dielectric strength of the dielectric layer, the insulation resistance and the thermal expansion coefficients are cause effective variables that can be determined through routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as through routine experimentation in the absence of a showing of criticality in the claimed properties such thermal expansion coefficient,

resistance and dielectric strength. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In regards to the non-flat, or cylindrical, substrate surface, it would have been obvious to one of ordinary skill in the art to modify the surface because it is merely a change in form or shape. In *Dailey et al*, 149 USPQ 47 (CCPA 1966).

In regards to the resistive trace that is in a pattern that is discontinuous circumferentially, *Manov et al* teaches an electrical heater system having a heating ribbon that is discontinuous circumferentially (Fig. 2A).

In regards to the plurality of traces, it would have been obvious to one of ordinary skill in the art to have a plurality of traces for a multiplied effect, in this case for improved heating. *In re Harza*, 124 PQ 378 (CCPA 1960). It would have been obvious to one skilled in the art to find the optimized pattern for heating from the traces through mere routine experimentation.

It would have been obvious to one of ordinary skill in the art to modify *Juliano* with silk screen printing of layers and materials for the elements as taught by *Riley* because it provides improved layering of materials and conduction of heat and a discontinuous circumferential pattern as taught by *Manov et al* because it allows for the ends of the trace to be at the same end.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Juliano et al* in view of *Riley* as applied to claims 1-3, 8, 9, 14-19, 22, and 28-31 above, and further in view of *Schmidt*.

Juliano fails to teach a longitudinal slot in the substrate.

Schmidt teaches a band heater clamp arrangement for an injection molding machine. Schmidt teaches an inner sleeve having an axial slot that extends through the entire length that allows for the inner sleeve to expand and close as temperature rises, thus allowing for the different thermal expansion rates between the inner sleeve and outer sleeve (Col. 2, lines 41-47).

It would have been obvious to one of ordinary skill in the art to modify Juliano with a slot as taught by Schmidt because it allows for heater to compensate for the thermal expansion of the substrate that is located on the inner sleeve.

5. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juliano et al in view of Riley as applied to claims 1-3, 8, 9, 14-19, 22, and 28-31 above, and further in view of Collins.

Juliano fails to teach the resistive layer comprises of a resistive trace and a lower-resistance conductive trace.

Collins teaches the formation of a thick film resistor and utilizes a resistive layer and a low-resistance conductive trace:

Each of the networks was fabricated on insulative alumina substrates by direct writing of the resistive line pattern r using commercially available ruthenium-based inks of different compositions (different sheet resistivities), whereby each pattern was written to achieve a different final effective width of the line r for the resistor segments. Both segments of each resistor network were written with one and the same line width. The effective line widths of the low resistance segments were achieved by writing a selected number of resistive lines in a parallel configuration between conductive terminal bars connected to respective conductive terminations. (Col. 6, lines 15-26)

The low resistance segments being the conductive trace, thereby low resistance, that is located with resistive lines (resistive trace) that forms the resistive layer, the patterning allows for optimum use of the resistive layer.

It would have been obvious to one of ordinary skill in the art to modify Juliano with a resistive layer comprised of a resistive trace and a conductive trace as taught by Collins because it allows for optimum configuration for the resistive trace pattern in the heater.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juliano et al in view of Riley as applied to claims 1-3, 8, 9, 14-19, 22, and 28-31 above, and further in view of Goldwin (EP 0963829 A1).

Juliano fails to teach the connector housing having a key for slidably engaging a longitudinal slot in the substrate.

Goldwin teaches an injection molding heater around a nozzle (130) comprising of a thin film heater (132) that has a connector (138), or key, that ensures the heater stays connected to the nozzle (Fig. 14A). One skilled in the art recognizes the above view of the nozzle and heater that the connector would be in a slot of the heater for engagement. The connector and slot also inherently ensures proper alignment of the heater with the nozzle for any desired configuration such as aligning with contact pads.

It would have been obvious to one of ordinary skill in the art to modify Juliano with slot and key as taught by Goldwin because it ensures interchangeable heaters to the nozzle that can be aligned accordingly.

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7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juliano et al in view of Riley as applied to claims 1-3, 8, 9, 14-19, 22, and 28-31 above, and further in view of Shipley.

Juliano fails to teach photoforming.

Shipley teaches photoforming of a dielectric element (Col. 5, lines 31-35) in a multiplayer circuit board and the photoform of openings (Col. 5, lines 24-25). One skilled in the art would recognize the use of photoforming for producing a layer onto another, in this case the resistive layer onto the dielectric layer.

It would have been obvious to one of ordinary skill in the art to modify Juliano with photoforming as taught by Shipley because it provides a method of formation of layers with photoimaging that allows for formation of multilayers of higher density using photoimaging techniques (Col. 4, lines 23-30).

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juliano et al in view of Riley as applied to claims 1-3, 8, 9, 14-19, 22, and 28-31 above, and further in view of Bottari et al.

Juliano fails to teach laser etching.

Bottari teaches the formation of a wire trace pattern with the use of laser etching or some other technique [0018]. One skilled in the art recognizes the employment of the well known technique of laser etching in the formation of integral wiring traces.

It would have been obvious to one of ordinary skill in the art to modify Juliano with laser etching as taught by Bottari because it provides a reliable and less labor intensive assembly can be formed.

Response to Arguments

9. Applicant's arguments filed 7/30/02 have been fully considered but they are not persuasive. The applicants primarily argue about the non-flat substrate limitation in combination of the silk-screened thick-film circuit elements. However, this argument of the shape of the surface of the substrates is merely a change in shape of the substrate. Juliano teaches that it is not practical to apply silk-screen on non-flat surfaces, but does not teach away from this. Teaching that a technique is not optimum for operations does not mean that the technique is not known or would have been non-obvious.

Allowable Subject Matter

10. Claims 6, 7 and 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach or suggest a heater having a substrate layer, a dielectric layer, resistive layer, contact pads and an insulation layer that

contains a connector housing for contacting the contact pad to the resistive layer in mechanical connection and having a locking detent and locating hole on the substrate.

The prior art of record, such as Juliano et al, does not teach the mechanical connection of the contact pads with the substrates by the connector housing. The pads are brazed or soldered thereby forgoing the need for a locking detent on the connector housing that connects with a locating hole on the substrate.

The prior art of record also fails to teach or suggest a heater having substrate layer, dielectric layer, resistive layer and contact pads, wherein the resistive layer contains a resistive trace with a discontinuous circumferential pattern that is silk-screened on the dielectric layer.

The closest prior art, Juliano et al and Manov et al, fails to teach such a pattern silk-screened on the dielectric layer.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (703) 305-1558. The examiner can normally be reached on Monday through Friday 8 to 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jan S. Silbaugh can be reached on (703) 308-3829. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

E.L.

December 16, 2002



JAN H. SILBAUGH
SUPERVISORY PATENT EXAMINER
ART UNIT 1722

12/16/02